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Peng Yin

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Robert D. Shedd, Patent Operations  
THOMSON Licensing LLC  
P.O. Box 5312  
Princeton, NJ 08543-5312

EXAMINER

THOMPSON, JAMES A

ART UNIT

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2625

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/560,567	<b>Applicant(s)</b> YIN ET AL.	
	<b>Examiner</b> James A. Thompson	<b>Art Unit</b> 2625	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2010.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)         | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)         | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### **Response to Arguments**

1. Applicant's arguments filed 17 December 2010 have been fully considered and are fully addressed herein.

**Regarding page 10, lines 1-14:** Applicant's amendments to the claims have been entered. The rejections under 35 U.S.C. § 101 are maintained for the reasons set forth below. The prior art rejections are withdrawn, but additional prior art rejections are set forth below. Therefore, **the prosecution of the application on the merits is re-opened.**

**Regarding page 10, line 15 to page 13, line 19:** Claims 1 and 37 each recite a video encoding method performed in a video encoder. However, the method comprises a series of digital data processing steps which simply internally manipulate digital data. The method does not transform any underlying subject matter to a different state or thing. Further, while recited as being performed in a video encoder, the method is not tied to any particular apparatus, as required by Bilski. The method merely performs computations upon digital data resulting in other digital data, and is thus an attempt to patent mathematical operations.

While the language of claims 1 and 37 state the method is in a video encoder, this is merely a nominal recitation and does not tie claims 1 and 37 to a particular machine. As disclosed in the specification and admitted by Applicant in Applicant's Response of 17 December 2010, the recited "video encoder" can be a variety of different types of hardware and/or software executed by a computer processor. Thus, claims 1 and 37 are not tied to a particular machine.

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Further, the recited methods are attempts to patent abstract ideas. To give an illustrative example, computing  $E = mc^2$  does not become statutory merely because the computation is performed using a computing device or some kind of dedicated hardware. The method of computing  $E = mc^2$  is an abstract idea since the computation is pure mathematics, regardless of the context in which the mathematics is performed. Likewise, claims 1 and 37 are merely mathematical processes being performed upon digital data.

There is no input or output, despite Applicant's assertions to the contrary, nor is there a concrete, tangible and useful result. In claim 1, there are four possible steps, only one of which is required to be performed according to the specific language of the claim. Step one involves checking modes, selectively checking other modes, and selecting a mode. The recited checking and selecting are internal, automated processes. There is no output and no input actually recited in the claims, even though Applicant may have intended such. Step two involves checking a mode and selecting a mode. There is no input or output in this step. Step three involves checking the cost of modes, conditionally checking modes based on the cost, and selecting a mode. There is no input or output in this step. Step four involves adjusting a threshold and conditionally selecting a mode. There is no input or output in this step. No concrete, tangible and useful result is obtained. The recited claims merely take digital data and perform mathematical processes on the digital data. Claims 1 and 37 are merely directed to abstract ideas, and are therefore not statutory processes. Claims 2-12 each depend from claim 1, and are therefore also non-statutory.

Claim 13 recites a video encoder comprising various “means for” performing various functions. Thus, Applicant's disclosed embodiments show the corresponding structure of the

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video encoder. See MPEP § 2182. As disclosed on page 6, lines 19-34 of Applicant's specification, the video encoder can be embodied as software, and can even be implemented through manual operations. Software per se is non-statutory. See MPEP § 2106.01(I). Furthermore, manual human operations do not constitute statutory subject matter. Thus, claim 13 is non-statutory. Claims 14-24 each ultimately depend from claim 13, and are therefore also non-statutory.

Claims 25-36, as amended by Applicant in the Response, recite statutory subject matter. Thus, the previous rejections of claims 25-36 under 35 U.S.C. § 101 are withdrawn.

**Regarding page 13, line 20 to page 14, line 19:** Applicant's amendments to claim 25 obviate the previous rejections of claims 25-36 under 35 U.S.C. § 112, first and second paragraphs. Accordingly, said rejections are withdrawn. However, the amendments to the claims create issues for claims 26, 28-31 and 34 with respect to 35 U.S.C. § 112, second paragraph, as set forth below.

**Regarding page 14, line 20 to page 18, line 18:** Examiner agrees with Applicant and withdraws the previous rejections of the claims under 35 U.S.C. § 102(a) and 35 U.S.C. § 103(a). However, additional prior art has been discovered which renders the presently recited claims obvious to one of ordinary skill in the art at the time of the invention. Accordingly, new grounds of rejection are set forth below.

**Claim Rejections - 35 USC § 101**

2. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

3. **Claims 1-24 and 37 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.**

Claims 1 and 37 each recite a video encoding method performed in a video encoder, the method comprising a series of digital data processing steps which simply internally manipulate digital data. The method does not transform any underlying subject matter to a different state or thing. Further, while recited as being performed in a video encoder, the method is not tied to any particular apparatus, as required by Bilski. The method merely performs computations upon digital data resulting in other digital data, and is thus an attempt to patent mathematical operations.

While the language of claims 1 and 37 state the method is in a video encoder, this is merely a nominal recitation and does not tie claims 1 and 37 to a particular machine. As disclosed in the specification and admitted by Applicant in Applicant's Response of 17 December 2010, the recited "video encoder" can be a variety of different types of hardware and/or software executed by a computer processor. Thus, claims 1 and 37 are not tied to a particular machine.

Further, the recited methods are attempts to patent abstract ideas. To give an illustrative example, computing  $E = mc^2$  does not become statutory merely because the computation is performed using a computing device or some kind of dedicated hardware. The method of

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computing  $E = mc^2$  is an abstract idea since the computation is pure mathematics, regardless of the context in which the mathematics is performed. Likewise, claims 1 and 37 are merely mathematical processes being performed upon digital data.

Further, there is no input or output, nor is there a concrete, tangible and useful result. In claim 1, there are four possible steps, only one of which is required to be performed according to the specific language of the claim. Step one involves checking modes, selectively checking other modes, and selecting a mode. The recited checking and selecting are internal, automated processes. There is no output and no input actually recited in the claims, even though Applicant may have intended such. Likewise, there is no input or output in any of steps two to four of the method. No concrete, tangible and useful result is obtained. The recited claims merely take digital data and perform mathematical processes on the digital data. Claims 1 and 37 are merely directed to abstract ideas, and are therefore not statutory processes. Claims 2-12 each depend from claim 1, and are therefore also non-statutory.

Claim 13 recites a video encoder comprising various “means for” performing various functions. Thus, Applicant’s disclosed embodiments show the corresponding structure of the video encoder. See MPEP § 2182. As disclosed on page 6, lines 19-34 of Applicant’s specification, the video encoder can be embodied as software, and can even be implemented through manual operations. Software per se is non-statutory. See MPEP § 2106.01(I). Furthermore, manual human operations do not constitute statutory subject matter. Thus, claim 13 is non-statutory. Claims 14-24 each ultimately depend from claim 13, and are therefore also non-statutory.

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**Claim Rejections - 35 USC § 112**

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 26, 28-32 and 34 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

Claim 26 recites the limitation "the signal data" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 28 recites the limitation "the signal data" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 29 recites the limitation "the signal data" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 30 recites the limitation "the signal data" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 31 recites the limitation "the signal data" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 34 recites the limitation "the signal data" in line 2. There is insufficient antecedent basis for this limitation in the claim.



**Claim Rejections - 35 USC § 102**

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. **Claims 1, 2, 4-6, 9-14, 16-18, 21-26, 28-30 and 33-37 are rejected under 35**

**U.S.C. 102(e) as being anticipated by Kondo (US-2004/0218674).**

**Regarding claims 1, 13 and 25:** Kondo discloses in a video encoder, a video encoding method for selecting the mode of a current macroblock of an inter-coded frame (**fig. 1 and para. 49, lines 1-11 of Kondo**), the method comprising at least one of:

checking first modes for a subset of macroblock modes (**para. 46-47 of Kondo**), selectively checking other modes in response to motion vector information of the checked first modes (**para. 48 of Kondo**), and selecting the mode for the current macroblock in response to the checked modes (**para. 49, lines 1-11 of Kondo**);

checking the macroblock mode of at least one neighboring macroblock (**paras. 53-54 and para. 57, lines 1-4 of Kondo**), and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock (**paras. 60-61 of Kondo**);

checking the cost of a subset of macroblock modes (**para. 60 of Kondo** - processing cost determined based on characteristics of neighboring macroblocks), further checking only intra-coded modes if the checked cost meets a preset criteria (**para. 60, lines 8-11 of Kondo**), and

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selecting the mode for the current macroblock in response to the checked modes (**para. 63, lines 1-6 of Kondo**); and

adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met (**para. 60 of Kondo** – if macroblock is intra-coded macroblock, motion vector is assumed to be zero; if all three are intra-coded or in direct mode, zero motion vector and intra-coding assumed; if two are intra-coded or in direct mode, inter-coding is used and motion vector assumed to be equal to motion vector of remaining macroblock).

Further regarding claim 13: The method of claim 1 is implemented by a video encoder (**fig. 1 of Kondo**).

Further regarding claim 25: The method of claim 1 is implemented via a computer-readable non-transitory medium (**para. 126, lines 14-17 of Kondo**).

**Regarding claims 2, 14 and 26:** Kondo discloses checking first modes for a subset of macroblock modes (**para. 46-47 of Kondo**), selectively checking other modes in response to motion vector information of the checked first modes (**para. 48 of Kondo**), and selecting the mode for the current macroblock in response to the checked modes (**para. 49, lines 1-11 of Kondo**).

**Regarding claims 4, 16 and 28:** Kondo discloses checking the macroblock mode of at least one neighboring macroblock (**paras. 53-54 and para. 57, lines 1-4 of Kondo**), and selecting the mode for the current macroblock in response to the macroblock mode of the at least one checked neighboring macroblock (**paras. 60-61 of Kondo**).

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**Regarding claims 5, 17 and 29:** Kondo discloses checking the cost of a subset of macroblock modes (**para. 60 of Kondo** - processing cost determined based on characteristics of neighboring macroblocks), further checking only intra-coded modes if the checked cost meets a preset criteria (**para. 60, lines 8-11 of Kondo**), and selecting the mode for the current macroblock in response to the checked modes (**para. 63, lines 1-6 of Kondo**).

**Regarding claims 6, 18 and 30:** Kondo discloses adjusting an early-stopping threshold in response to checked macroblock modes, and selecting the mode for the current macroblock in response to the checked macroblock modes if the adjusted early-stopping threshold is met (**para. 60 of Kondo** – if macroblock is intra-coded macroblock, motion vector is assumed to be zero; if all three are intra-coded or in direct mode, zero motion vector and intra-coding assumed; if two are intra-coded or in direct mode, inter-coding is used and motion vector assumed to be equal to motion vector of remaining macroblock).

**Regarding claims 9, 21 and 33:** Kondo discloses wherein spatial/temporal neighboring macroblock and block partition information is used to decide the subset of possible block sizes or inter/intra modes that need to be checked (**figs. 3a-3d and para. 60 of Kondo**).

**Regarding claims 10, 22 and 34:** Kondo discloses initially performing mode checking for a subset of both inter modes and intra modes (**para. 60 of Kondo**);

calculating a complexity measure responsive to the mode checking (**para. 60, lines 4-11 of Kondo**); and

using the complexity measure to determine if other inter modes and intra modes should be performed (**para. 63 of Kondo**).

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**Regarding claims 11, 23 and 35:** Kondo discloses wherein the early stop criteria are based on adaptive thresholding to stop checking other inter or intra modes (**para. 60, lines 4-11 of Kondo** – motion vectors for mode determination are computed based on whether the neighbor macroblock should be checked).

**Regarding claims 12, 24 and 36:** Kondo discloses wherein early termination takes place if spatially or/and temporally neighboring macroblocks have a specific relationship with the motion information of the current macroblock after examining a specific mode (**para. 60, lines 4-11 of Kondo** – if intra-coded macroblock, motion vector is assumed to be zero and no further examination is performed).

**Regarding claim 37:** Kondo discloses in a video encoder, a video encoding method for selecting the encoding mode of a macroblock of an inter-coded frame (**fig. 1 and para. 49, lines 1-11 of Kondo**), the method comprising:

selecting a subset of macroblock modes for encoding (**figs. 3a-3d and para. 55 of Kondo**);

comparing said subset of macroblock modes for coding efficiency (**paras. 60 and 63 of Kondo** – inter/intra coding and motion vectors to be computed are determined using the macroblock modes of neighboring macroblocks based on assumptions regarding the motion vectors); and

selecting a mode having favorable coding efficiency, responsive to said step of comparing modes (**para. 57, lines 1-4; para. 58, lines 1-4; para. 59, lines 1-5; and para. 64 of Kondo**).

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**Claim Rejections - 35 USC § 103**

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. **Claims 3, 15 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondo (US-2004/0218674) in view of Wang (US-2003/0099292).**

**Regarding claims 3, 15 and 27:** Kondo does not disclose expressly wherein said first modes comprise the quadratic modes of SKIP, 16x16, 8x8, and 4x4.

Wang discloses wherein said first modes comprise the quadratic modes of SKIP (para. 97 of Wang), 16x16, 8x8, and 4x4 (figs. 3a-3f and para. 57-58 of Wang).

Kondo and Wang are combinable because they are from the same field of endeavor, namely digital video data encoding. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to use the quadratic modes of SKIP, 16x16, 8x8, and 4x4, as taught by Wang. The suggestion for doing so would have been that the modes are commonly used modes for macroblock encoding. Therefore, it would have been obvious to combine Wang with Kondo to obtain the invention as specified in claims 3, 15 and 27.

### **Allowable Subject Matter**

10. Claims 7, 8, 19, 20, 31 and 32 contain potentially allowable subject matter if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and if the rejections with respect to 35 U.S.C. 101 and/or 35 U.S.C. 112 set forth above are successfully resolved.

The following is a statement of reasons for the indication of allowable subject matter:

Claim 1 recites a video encoding method for selecting the mode of a current macroblock of an inter-coded frame, which includes four possible steps. Claim 7 further limits claim 1 by requiring the steps of: initially performing motion estimation only for a subset of the possible block sizes; and using the motion information to determine if other motion estimation or complexity measures should be performed for other block sizes. Examiner has not discovered this method in the prior art. Thus, claim 7 contains potentially allowable subject matter.

Claims 19 and 31 contain potentially allowable subject matter for reasons similar to those set forth for claim 7. Claims 8, 20 and 32 contain potentially allowable subject matter owing to their respective dependencies from claims containing potentially allowable subject matter.

### **Conclusion**

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- a. Murakami et al., US-2004/0202245, Published 14 October 2004, Filed 04 May 2004, Division of Application filed 16 December 1998.
- b. Nakata, US-2002/0181790, Published 05 December 2002.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is (571)272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward L. Coles can be reached on 571-272-7402. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A Thompson/  
Primary Examiner, Art Unit 2625

30 December 2010